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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/389,537 09/02/99 WARREN P DIVER1240-3

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HM22/0703

EXAMINER

SLOBODYANSKY, E

ART UNIT	PAPER NUMBER
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1652

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DATE MAILED:

07/03/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/389,537

Applicant(s)
Warren et al.

Examiner
Elizabeth Slobodyansky

Group Art Unit
1652



☒ Responsive to communication(s) filed on Apr 30, 2001

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 17-27 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 17-27 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

The amendment filed April 30, 2001 amending claims 17 and 18 and adding claims 19-27 has been entered.

Claims 17-27 are pending.

Rejections and/or objections not reiterated from previous Office action are hereby withdrawn.

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

Specification

The specification is objected to because it refers to the biological deposits at ATCC without indicating ATCC Deposit No. For example, on pages 3 and 6.

There is no description of Figures 9 and 10, the description of Figure 11 is incorrect.

The specification incorporates by reference provisional application 60/008,316 that expired (page 22).

This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821(a)(1)

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and (a)(2). However, this application fails to comply with the requirements of 37 CFR 1.821 through 1.825. 37 CFR 1.821(d) requires the use of assigned sequence identifier in all instances where the description or claims of a patent application discuss sequences.

The following is an example of incompliance where the sequence containing more than ten nucleotides is given without a sequence identifier: page 27, last two paragraphs.

The paper copy of the Sequence Listing is different from the computer readable form thereof.

Claim Rejections - 35 USC § 112

Claims 17-27 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 17-27 are drawn to a transaminase or aminotransferase having an amino acid sequence which is 70, 80, 90 or 95% identical to SEQ ID NOs 25-32 and a method of use thereof for transferring an amino group. While enzymes having amino acid sequences of SEQ ID NOs: 25-32 are specific transaminases or aminotransferases, it is unknown what specific transaminase or aminotransferase will have an amino acid

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sequence that is 70% identical to said sequences. Therefore, claims 17-27 are directed to vast diverse classes of enzymes, transaminases or aminotransferases, and methods of use thereof. "Transaminase or aminotransferase" encompass diverse enzymes having any substrate and stereo specificity. While the claims impart a structural limitation (70, 80, 90 or 95%), there is no specific functional limitation.

The putative activity of enzymes having the amino acid sequences of SEQ ID NOs:25-32 is based on the homology with other enzymes (pages 4-5; page 8, Table 1). This homology is on average about 40%. An enzyme with 70% identity will be about 30% homologous. The enzymes to which SEQ ID NOs: 25-32 are homologous have different substrate and stereo specificity. The correlation between the structure and function is not disclosed in the specification nor is known in the art. Therefore, it is unpredictable what will be the specific transaminase or aminotransferase function of a protein having an amino acid sequence that is 70% homologous to the claimed sequences.

With regard to claim 18, the specification teaches the putative function of enzymes of SEQ ID NOs: 25-32, said function does not for all enzymes consists of transferring an amino group from an amino acid (pages 4-5; page 8, Table 1, for example, SEQ ID NOs: 27 and 30-32). The specification does not disclose identifying characteristics which would allow to distinguish a transaminase or aminotransferase of

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a specific substrate and stereo specificity from another transaminase or aminotransferase.

Thus, a transaminase or aminotransferase of unknown specificity, having an amino acid sequence which is 70, 80, 90 or 95% identical to SEQ ID NOs 25-32 that is capable of transferring of an amino group from any amino acid to any α -keto acid lacks sufficient written description.

Claims 17-27 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a transaminase or aminotransferase having amino acid sequences as set forth in SEQ ID NOs: 25-32, does not reasonably provide enablement for a transaminase or aminotransferase of unspecified specificity having an amino acid sequence 70, 80, 90 or 95% identical to SEQ ID NOs: 25-32 and a method of use thereof. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Factors to be in In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir. 1988). They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) considered in determining whether undue experimentation is required, are

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summarized the predictability or unpredictability of the art, and (8) the breadth of the claims.

Despite knowledge in the art to produce mutations in proteins and the isolation of DNA molecules, the specification fails to provide guidance as to where, and what type of (i.e., what amino acid to substitute into, add to and/or delete from the known sequence), changes in amino acid residues will result in a specific transaminase or aminotransferase activity. Therefore, the breadth of these claims is much larger than the scope enabled by the specification.

The state of the art does not allow the predictability of the properties based on the structure. The amino acid sequence of a protein determines its structural and functional properties and knowledge of which residues can be altered or removed, so that they retain 70, 80, 90 or 95% identity, and result in a specific activity is well outside the realm of routine experimentation. Since the state of the art does not allow the predictability of the properties based on the structure, it is unpredictable what will be the function, substrate and stereo specificity of a transaminase or aminotransferase with the amino acid sequence 70, 80, 90 or 95% identical to SEQ ID NOs:25-32. Furthermore, with regard to claims 18 and 23-27, the specification does not teach how to modify the sequence of the parent enzyme to impart the ability to transfer an amino group from an amino acid to α -keto acid if the parent enzyme does not exhibit said function (for example, SEQ ID NO : 27 and 30-32).

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While a method for transferring an amino group from a specific amino acid to an α -keto acid corresponding to an amino acid to be produced is enabled for some enzymes of SEQ ID NOs: 25-32 according to their specificity, it is not enabled for enzymes of SEQ ID NOs: 27 and 30-32, for example. It is not enabled for a unspecified transaminase or aminotransferase having a sequence that is 70% homologous to SEQ ID NOs: 25-32.

Therefore, one skilled in the art would require guidance as to how to make a transaminase or aminotransferase of an unspecified function with the amino acid sequence that is 70, 80, 90 or 95% identical to SEQ ID NOs: 25-32 and how to use said enzyme for transferring an amino group from any amino acid to any α -keto acid in a manner reasonably correlated with the scope of the claims. Without such guidance, the experimentation left to those skilled in the art is undue.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
Claims 17-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 17 and 18 recite "the amino acid sequence set forth in SEQ ID NOs: 25-32". It should recite "in any one of SEQ ID NOs: 25-32", for example. Claim 18 recites

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"an enzyme which is at least 70% identical to the amino acid sequence". Not an enzyme but its amino acid sequence is identical to another sequence.

Claims 23-27 are confusing because they are drawn to an enzyme of claim 18 while claim 18 is drawn to a method.

Response to Arguments

Applicant's arguments filed April 30, 2001 have been fully considered but they are not persuasive.

Applicants argue that "70% amino acid identity to a known amino acid sequence is a *structural* characteristic" (page 6, 1st paragraph). And further, that "claim 17 also requires that the putative enzyme meet a functional test (i.e. have activity as a transaminase or aminotransferase)" (page 6, 2nd paragraph). As discussed above, "transaminase or aminotransferase" encompasses vast number of different enzymes with different specificity. The claims are not drawn to an aspartate transaminase having an amino acid sequence that is 70% identical to SEQ ID NO: 25, for example, but to any transaminase or aminotransferase. Further, claim 18 and dependent claims encompass any structure that is α -keto acid. Therefore, the rejections under 112 are made not over an aspartate transaminase having an amino acid sequence that is 70%

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identical to SEQ ID NO: 25, for example, but over a transaminase or aminotransferase of unspecified substrate and stereo specificity.

Terminal Disclaimer

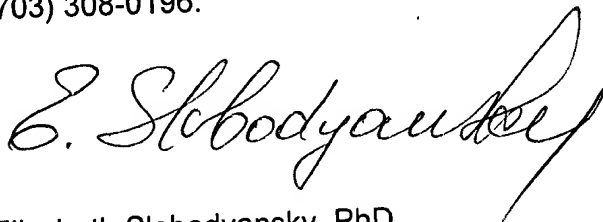
The terminal disclaimer filed on April 30, 2001 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent 5,814,473 and any patent granted on Application Number 09/412,184 has been reviewed and is accepted. The terminal disclaimer has been recorded.

The instant application is a continuation of application 08/646,590, now US Patent 5,962,283.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Slobodyansky whose telephone number is (703) 306-3222. The examiner can normally be reached Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Ponnathapura Achutamurthy, can be reached at (703) 308-3804. The FAX phone number for Technology Center 1600 is (703) 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Center receptionist whose telephone number is (703) 308-0196.



Elizabeth Slobodyansky, PhD
Primary Examiner

June 29, 2001